REMARKS

Claims 4, 76, 77, 81-85 and 89-92 are pending in the present application. In the Office Action dated April 23, 2003, the Examiner rejected claims 4 and 89 under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Application No. US 2001/0001501 A1 to Lee ("Lee '501"). The Examiner further rejected claims 4, 81, 85 and 89 under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 5,846,859 to Lee ("Lee '859"). The Examiner also rejected claims 10, 81 and 85 under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,100,187 to Hintermaier, et al. ("Hintermaier").

Claim 90 is rejected under 35 U.S.C. § 103(a) as unpatentable over Lee '501 in view of applicant's specification. Claims 90, 91 are rejected under 35 U.S.C. § 103(a) as unpatentable over Lee '859 in view of applicant's specification. Claims 76, 81-83 and 85 are rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,723,384 to Park, in view of Hintermaier. Claims 77 and 92 are rejected under 35 U.S.C. § 103(a) as unpatentable over Park, in view of Hintermaier and further in view of applicant's specification. Finally, claim 84 is rejected under 35 U.S.C. § 103(a) as unpatentable over Park in view of Hintermaier and further in view of U.S. Patent No. 6,309,713 to Mak, *et al.* ("Mak"). Applicant disagrees with these grounds of rejection and wishes to clarify various distinctions of applicants' invention over the cited art. Reconsideration is therefore requested in light of the present amendment and following remarks.

Some of the technical differences between the applied reference and embodiments of the invention will now be discussed. Of course, these discussed differences, which are disclosed in detail in the patent specification, do not define the scope or interpretation of any of the claims. Where presented below, such discussed differences merely help the Examiner appreciate important claim distinctions discussed thereafter.

The various embodiments of the present invention are directed toward a method for protecting a conductive layer from oxygen. In one embodiment, the method includes preventing or at least limiting a first conductive layer from incorporating oxygen beneath the surface of the layer. Other embodiments of the present invention include methods for limiting the ability of the first conductive layer to adsorb oxygen. Such embodiments may help prevent

the diffusion of oxygen into a second conductive layer, thereby protecting against oxidation between the conductive layers. In one particular embodiment, one of the conductive layers is exposed to an N_2/H_2 plasma before another conductive layer is applied. The foregoing embodiment may also be performed *in situ* relative to the environment or ambient atmosphere in which the one conductive layer was provided.

Other embodiments include the use of other nitrogen-containing plasmas, as well as the use of nitrogen-containing gases that are not in plasma form. Yet other embodiments may also use gases that do not contain nitrogen. Still other embodiments protect against oxidation between conductive layers with a step performed *ex situ* relative to the environment or ambient atmosphere in which the one conductive layer was formed. In another embodiment, silane gas. or other similar gases are flowed over the conductive layer.

The Examiner has cited Lee '501, which discloses methods for forming integrated circuit capacitors, including the steps of forming a lower electrode of a capacitor by forming a conductive layer pattern on a semiconductor substrate. In a pertinent embodiment, a hemispherical grain silicon surface layer of a first conductivity type is formed on the conductive layer pattern. Steps are also performed to anneal the conductive layer pattern and to dope the hemispherical grain silicon surface layer using a phosphine gas source.

Lee '501 does not disclose or suggest using methylsilane in the formation of integrated circuit devices. Specifically, Lee '501 does not disclose or suggest passivating a conductive material, wherein the conductive material is exposed to methylsilane.

The Examiner has also cited Lee '859. Lee '859 discloses a method for manufacturing a semiconductor memory device having a capacitive storage element. In a pertinent embodiment, the method includes forming a capacitor in a semiconductor device having a dielectric film formed of a dielectric material and an amorphous silicon carbide layer. The silicon carbide layer may be formed by a chemical vapor deposition process involving a gas including silane and propane, silane and benzene, and by adding phosphine or arsenic hydride to the gas (col. 2, lines 45-50).

Lee '859 does not disclose or suggest using methylsilane in the formation of a semiconductor memory device having a capacitive storage element. In particular, Lee '859 does

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not disclose or suggest passivating a conductive material, wherein the conductive material is exposed to methylsilane.

The Examiner has also cited the Hintermaier reference. Hintermaier discloses a method of forming a barrier layer in a semiconductor body. In a pertinent embodiment, the method includes forming a barrier layer on a contact plug in the semiconductor body. The barrier layer is produced by chemically reacting a prestructured metallic transition material with one or more reaction partners, that include methane and phosphine.

Hintermaier does not disclose or suggest using methylsilane in the formation of a barrier layer in a semiconductor body. In particular, and contrary to the Examiner's assertion, Hintermaier does not disclose or suggest the use of methylsilane in any process.

The Examiner further relies on the Park reference. Park discloses a method for manufacturing a capacitor in a semiconductor device. The method includes forming a tungsten nitride thin film on a conductive pattern using a chemical vapor deposition process, and a reaction agent of H_2, SiH_4, $SiHlCl_3$, SiH_2Cl_2 , or B_2H_6. (col. 4, lines 10-15). Park does not disclose or suggest using methylsilane in the method.

Finally the Examiner has cited the Mak reference. Mak discloses a method of forming a layer of tungsten nitride on a semiconductor wafer. The deposition is performed by providing a gaseous mixture forming the layer in a chemical vapor deposition process. Mak does not disclose or suggest using methylsilane in the method.

Turning now to the claims, patentably distinct difference between the claim language and the applied art will be pointed out. Claim 4, as amended, recites in pertinent part: "A method of passivating a conductive material, comprising...providing said conductive material, wherein said conductive material has an ability to associate with oxygen...and...*exposing said conductive material to methylsilane.*" (Emphasis added). None of the applied references disclose or suggest exposing a conductive material to methylsilane. Claim 4 is therefore allowable over the cited art. Claims depending from claim 4 are also allowable based upon the allowability of the base claim and further in view of the additional limitations recited in the dependent claims.

Claim 76, as amended, recites in pertinent part: "A method of passivating a conductive layer, comprising...providing a tungsten nitride layer...providing a polysilicon layer

on the tungsten nitride layer...and...*exposing the tungsten nitride layer to methylsilane.*" (Emphasis added). Again, none of the applied references disclose or suggest exposing a conductive material to methylsilane. Claim 76 is therefore allowable over the cited art. Claims depending from claim 76 are also allowable based upon the allowability of the base claim and further in view of the additional limitations recited in the dependent claims.

Claim 81 as amended recites: "A method of passivating a conductive layer, comprising...providing a first conductive plug...providing a first conductive layer on the plug...*exposing the first conductive layer to methylsilane...* and...after exposing the first conductive layer, forming a second conductive layer on the first conductive layer." (Emphasis added). Yet again, none of the applied references disclose or suggest exposing a conductive material to methylsilane. Claim 81 is therefore allowable over the cited art. Claims depending from claim 81 are also allowable based upon the allowability of the base claim and further in view of the additional limitations recited in the dependent claims.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a timely Notice of Allowance are earnestly solicited.

Respectfully submitted,

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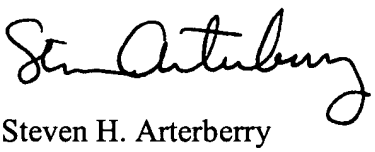

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